pound of cyanogen and iron, or ferrocyanogen as it exists in the yellow salt, is evolved at the zincode; and they not only converted the yellow into the red salt by electrolytic action, but, conversely, reproduced the yellow from the red.

In pursuing their researches on double salts, a new order of facts was brought to light, which clearly proved that although the two ions of the electrolyte are always *evolved* in equivalent proportions, yet that they are not *transferred* in equivalent proportions to the respective electrodes; that some bases, such as copper, zinc, iron and alumina, do not travel at all towards the platinode; that some, as magnesium, do so in small proportion only; and that others, as barium and potassium, are transferred in greater abundance; those whose oxides are most soluble appearing to travel most easily. On the other hand, the acids, whether forming soluble hydrates or not, seem all to travel towards the zincode, in proportions dependent principally on the nature of the base with which they are united.

The curious phenomena which have thus been brought to light, concur in establishing the general fact, that the disengagement of the cation and anion of an electrolyte in equivalent proportion is not always affected, as is commonly represented, by their simultaneous transfer in opposite directions to their respective electrodes, in the exact proportion of half an equivalent of each; but that it is sometimes brought about by the transfer of a whole equivalent of the anion to the zincode, whereby a whole equivalent of the cation is left uncombined at the platinode, or by the transfer of unequivalent portions of each in opposite directions, making together a whole equivalent of matter transferred either to one electrode or to the other; or, in other words, by the transfer of a quantity of matter capable of exercising one equivalent of chemical force: so that when the anion transferred to the zincode exceeds half an equivalent, the cation transferred to the platinode is, in an equal proportion, less than half an equivalent, and *vice versâ*; the anion and cation set free being always in equivalent proportions. In no case, however, has there been observed the transfer of a whole equivalent of the cation to the exclusion of the anion.

These facts, the authors conceive, are irreconcileable with any of the molecular hypotheses which have been hitherto imagined to explain the phenomena of electrolysis.

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March 21, 1844.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

"A description of certain Belemnites, preserved, with a great proportion of their soft parts, in the Oxford clay at Christian Malford, Wilts." By Richard Owen, Esq., F.R.S., &c., Hunterian Professor of Anatomy and Physiology in the Royal College of Surgeons.

The author describes, in the present paper, specimens of Belemnite, discovered in the Oxford-clay at Christian Malford, Wilts, and

which are remarkable for the preservation of many of the soft parts of the animal. After alluding to the various opinions promulgated by different authors respecting the nature and affinities of this extinct animal, he adverts more especially to the discovery of the ink-bag of the Belemnite, which was published in the Zoological Transactions, vol. ii., and in the Cyclopædia of Anatomy and Physiology (Art. Cephalopoda). This discovery led him, on the strength of deductions from the physiological relations of this organ, to remove the Belemnite from the *Polythalamacea* of De Blainville, and place it in the higher order of the naked Cephalopods.

The structure of the shell is next discussed, and the spathose dart, or guard, is proved to be the result of original organization, both by its microscopic structure and by the fact that the chambers of the phragmocone have not been infiltrated by mineral substance in any of the specimens described: the name *phragmocone* being applied to the chambered and siphonated conical division of the compound shell of the Belemnite; and the term *alveolus* being restricted, in the present paper, to the socket or cavity at the base of the guard, in which the phragmocone is lodged. A detailed description is given of the sheath of the phragmocone and of the structure of the chambers. The state of preservation of the present specimens has enabled the author to describe the form and extent of the mantle—its continuation over the exterior of the shell, and the arrangement of its muscular fibres. The animal is provided with two lateral fins of a semi-oval figure, which are attached to the middle of the mantle, in advance of the spathose dart.

The muscular fibres of the fins, the infundibulum and its muscles are next described; and also the head, the eyes, which are large and sessile, and the cephalic arms, which are eight in number; together with traces of two slender superadded tentacula. The ordinary arms are furnished with a double alternate row of sharp horny hooks, as in some existing species of *Onychoteuthis*, but the arms are relatively longer. Their muscular structure is traced in the fossil specimens, and compared with that in the recent Decapoda. The ultimate, or primitive fibres of the muscles of the Belemnite agree in size with those in the *Onychoteuthis*; but the character of the transverse striæ, which is feebly developed in the primitive muscular fibre of the Cephalopods, is not preserved in the fossil. Of the interior organs of the Belemnite, besides the ink-bag and duct, which had been before discovered by Drs. Buckland and Agassiz, the remains of the horny lining of the gizzard are preserved in the present fossils.

Thus the deduction that the higher, or dibranchiate type of Cephalopodal organization is necessarily associated with the presence of the atramental apparatus, is established by the demonstration, in these fossil Belemnites, of a fleshy mantle, inclosing the shell, and provided with a pair of muscular fins, of large and sessile eyes, and of few, but large and complex cephalic arms.

The author concludes by pointing out the more immediate affinities of the Belemnites, and showing that it combines characteristics which are now divided amongst distinct genera: as, for example,

first, a complex internal shell, divisible into the same principal parts as that of the *Sepia*, but one of which has, secondly, the same essential chambered structure as the shell of the *Spirula*; thirdly, uncinated cephalic arms, as in the *Onychoteuthis*; and lastly, an advanced position of rounded fins, as in the *Spirula* and *Rossia*.

The paper is illustrated by drawings of the specimens described, with microscopic views of the shell and muscular tissue, and a restoration of the Belemnite according to the data afforded by the present fossils.

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April 18, 1844.

The MARQUIS OF NORTHAMPTON, President, in the Chair.

1. Note in addition to Mr. Gassiot's paper on the "Water Battery." The author here describes an instrument which he has recently constructed, and by means of which he is enabled with great facility, and without the aid of Zamboni's pile, to test the tension in a single series of the voltaic battery.

2. "On the production of Ozone by Chemical Means." By Professor Shoenbein, in a letter to Michael Faraday, Esq., D.C.L., F.R.S. Communicated by Dr. Faraday.

The author conceives that of the two gaseous principles which are simultaneously produced during the slow action of phosphorus upon atmospheric air, and which have opposite voltaic characters, that which exerts electro-positive properties is composed of vaporized phosphorus, conjoined with particles of phosphatic acid; and the other, which is electro-negative, is identical with *ozone*, or the odoriferous principle which is disengaged at the positive electrode during the electrolysis of water. His opinion is founded on the odour of the one not being distinguishable from that of the other.

3. "Contributions to Terrestrial Magnetism." No. VI. By Lieut.-Colonel Sabine, R.A., F.R.S.

This portion of the series consists of observations made on board Her Majesty's ships Erebus and Terror, from June 1841 to August 1842, in the Antarctic Expedition under the command of Captain Sir James Clark Ross, R.N., F.R.S. It comprises the result of the operations conducted during the second year of the expedition, when it proceeded early in July 1841, from Hobarton to Sydney, and thence to the Bay of Islands in New Zealand, remaining there till November, and reaching, in February 1842, in latitude 78°, the icy barrier which had stopped their progress in the preceding year. Quitting the antarctic circle in March, and keeping nearly in the 60th parallel, they crossed the whole breadth of the Southern Pacific Ocean to the Falkland Islands, where they arrived in April 1842.

On a general review of the magnetic declination in the southern